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AN ANALYSIS OF GRADUATE WORK IN INSTITUTIONS WITH PROGRAMS FOR INDUSTRIAL ARTS EDUCATION PERSONNEL.

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THE PURPOSES OF THIS STUDY WERE TO EXAMINE (1) THE STATUS OF CERTAIN ORGANIZATIONAL PROCEDURES AND PRACTICES IN GRADUATE PROGRAMS OF INDUSTRIAL ARTS EDUCATION, (2) THE EXTENT TO WHICH SPECIALIZED TECHNICAL, RESEARCH, TEACHING, AND ADMINISTRATION COMPETENCIES ARE DEVELOPED AMONG GRADUATE STUDENTS, AND (3) THE PROVISION FOR GENERAL LIBERAL EDUCATION COURSES IN GRADUATE INDUSTRIAL EDUCATION. QUESTIONNAIRES RETURNED BY REPRESENTATIVES OF 87 INSTITUTIONS IN 36 STATES SHOWED THAT ALL OFFERED THE MASTER'S DEGREE, AND 17 THE DOCTOR'S DEGREE, AND 16 THE SPECIALIST'S DEGREE. INDUSTRIAL ARTS WAS REPRESENTED IN 21 PROGRAMS, VOCATIONAL-INDUSTRIAL EDUCATION IN 18 PROGRAMS, AND TECHNICAL EDUCATION IN 14 PROGRAMS. SOME CONCLUSIONS WERE (1) IT IS QUESTIONABLE WHETHER THE LESS THAN 12 PERCENT TECHNICAL CONTENT OF THE DOCTORAL PROGRAM AND THE 25 PERCENT OF THE MASTER'S PROGRAM IS ADEQUATE TO DEVELOP TECHNICAL COMPETENCIES, (2) THE PRIMARY OPPORTUNITIES FOR DEVELOPING RESEARCH COMPETENCIES AT THE MASTER'S LEVEL ARE COURSES SUCH AS STATISTICS, RESEARCH METHODS, AND PROBLEMS, (3) OPPORTUNITIES FOR DEVELOPING TEACHING AND ADMINISTRATIVE COMPETENCIES APPEAR TO BE PRESENT IN THE PROFESSIONAL COURSES AND THE REQUIRED TEACHING EXPERIENCE, AND (4) MOST INSTITUTIONS RECOMMEND THAT GRADUATE STUDENTS TAKE GENERAL AND LIBERAL EDUCATION COURSES, AND THEY OFFER A VARIETY OF SUCH COURSES. THIS DOCUMENT IS AVAILABLE FOR $1.75 FROM THE AMERICAN INDUSTRIAL ARTS ASSOCIATION, 1201 SIXTEENTH STREET, N.W., WASHINGTON, D.C. 20036. (EM)

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For The Graduate Studies Committee
Of The
AMERICAN COUNCIL ON INDUSTRIAL ARTS TEACHER EDUCATION
A DIVISION OF THE AMERICAN INDUSTRIAL ARTS
ASSOCIATION AND THE NATIONAL EDUCATION ASSOCIATION
1965

An Analysis Of Graduate Work In Institutions With Programs For Industrial Arts Education Personnel

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PREFACE

This is the first of a series of monographs to be published by the American Council on Industrial Arts Teacher Education. They will be printed and distributed as significant contributions are brought to the attention of the Publications Committee. A positive schedule of publication has been avoided, thereby permitting multiple publications during a single year, or skipping a year when pertinent information is not available.

Among the primary sources of manuscripts are the ACIATE committees working on problems facing industrial arts teacher education. Often their findings are too extensive for presentation as a journal article or of interest to only teacher educators. Whenever possible, committee findings of significant value will be published as either an ACIATE monograph or as an article in the Journal of Industrial Arts Education.

The Publications Committee may, at their discretion, seek manuscripts from ACIATE members or representatives of related disciplines. Their primary guide will be the identification of information which, when published and distributed, will promote the advancement of industrial arts and help fulfill the other objectives of the ACIATE.

This monograph is the product of our Graduate Studies Committee chaired by Dr. Jerome Moss, Jr., University of Minnesota. This report, which has been prepared by Dr. Wilbur Miller, University of Mossouri, and Dr. Richard Ginther, Chico State College, (California), represents the completion of the first step in the Committee's planned sequence of activities. It provides a description of current practices in post-baccalaureate programs of industrial arts teacher education, locates a reference point from which change may be measured, and supplies the basis for future evaluative comparison.

Other studies, now in progress by members of the Graduate Studies Committee, will attempt to (1) ascertain the profession's opinion with respect to desirable changes in current practice, (2) highlight the major controversies involved in the direction of change, (3) provide statements of position with respect to the controversies, and (4) supply information about certain educational trends and practices which directly effect the change potential. Future meetings of the Council may be planned in which this resource material can be utilized as the basis for constructive discussion about post-baccalaureate programs.

Final credit for publication of this study must be given the ACIATE Publications Committee, consisting of Dr. Ethan Svendsen, Indiana State University, Dr. Daniel Householder, Purdue University, and Dr. Bryce D. March, Southeast Missouri State College. Questions regarding publication of future monographs should be direct to Dr. Svendsen while comments or questions regarding the content of this publication should be directed to the co-authors, Drs. Miller and Ginther.

RALPH C. BOHN

President, ACIATE

AN ANALYSIS OF GRADUATE WORK IN INSTITUTIONS WITH PROGRAMS FOR INDUSTRIAL ARTS EDUCATION PERSONNEL*

I. STATEMENT OF THE PROBLEM

Persons providing leadership for graduate programs in the colleges and universities of the United States have been coping with the problems associated with expanding enrollments while at the same time attempting to raise standards and generally improve the quality of graduate work. These factors often bring about changes in the structure of programs even though the basic role of producing, classifying, and utilizing knowledge remains constant in graduate study. Graduate programs in industrial arts education are not exempted from these pressures for change. In fact, due to the relatively short tradition of graduate programs in industrial arts education, the impact of these pressures may be of greater significance to industrial arts education than to graduate programs representing older educational disciplines.

In order for change to be directed in an orderly and systematic manner, some facts regarding the existing structure must be known and some degree of acceptance of the basic functions of graduate education must be secured. Even though there is some variation from one graduate school to another, most councils, professional societies, and agencies giving direction to higher education agree on four major functions of graduate education. In the 1961 yearbook of the American Council on Education[1] graduate education is described as those specialized forms, or functions, which provide for (1) specialization in several professional areas, (2) the development of research competencies, (3) the development of teaching and administrative competencies essential to the profession, and (4) a variety of experiences in general and liberal education. The American Council on Education further emphasizes the necessity for balance in graduate programs that will provide for the many needed requirements or demands. The type and amount of experience necessary to provide a balanced program of graduate study in industrial arts teacher education is a rather urgent matter for professional study

In view of the increasing enrollments, desire to revise present programs, demands for new programs of graduate study, and an increased emphasis upon graduate level experiences for all teachers of industrial arts, it is important that industrial arts educators know in

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*Basic data for this report have been drawn from information forms collected by Dr. Richard E. Ginther in conjunction with a previous research study, "An Analysis of, and Opinions Concerning, Graduate Programs in Industrial Education" (Unpublished Doctor's dissertation, University of Missouri, Columbia, Missouri) completed in August, 1964.

[1]American Council on Education, **Higher Education in the United States** (Washington, D. C.: American Council on Education, 1961), pp. 43-44.

what ways and to what extent present programs comply with the basic functions of graduate education in order that any needed change can be fostered in an orderly fashion.

II. PURPOSE OF THE STUDY

The purpose of this study was to ascertain in what ways and to what extent the four functions of graduate education were being provided for and developed in institutions with graduate programs for industrial arts education personnel in the colleges and universities of the United States. More specifically, the study sought to answer the following questions.

1. What is the status of certain organizational procedures and practices of graduate programs in industrial arts education that relate to the four basic functions of graduate education?
2. How and to what extent are specialized technical competencies being developed among graduate students in the various areas of industrial arts education?
3. How and to what extent are research competencies being developed among graduate students in industrial arts education in the methods and procedures of understanding and conducting research?
4. How and to what extent are teaching and administrative competencies being developed among graduate students of industrial arts education?
5. How and to what extent are general and liberal education courses being provided for and undertaken in the graduate programs in industrial arts education?

Definition of Terms

The following terms are defined as they are used in the study:

7. "Graduate programs in industrial arts education" are programs for the preparation and upgrading of personnel in industial arts education who work at all levels of the educational spectrum.

2. "Specialized technical competencies" refer to those competencies developed through courses and experiences in a classroom, shop, laboratory or industry, which provide graduate students with the opportunity to develop technical skills and gain related knowledge in specialized areas of industrial education, e.g. drafting, metalwork, or electricity, or through work in industry.

3. "Research competencies" refer to those competencies developed through courses and experiences that are provided to develop competencies in the methods and procedures of understanding and conducting

research studies, e.g. research procedures, statistics, and computer programming.

4. "Teaching and administrative competencies" refer to those competencies developed through professional education courses and experiences in industrial arts education and other areas of professional education, e.g. secondary school administration and philosophy of education.

5. "General and liberal education" refers to all courses other than technical, research, and professional education courses that are provided for and may be taken by industrial arts education students for graduate credit, e.g. science, history, mathematics, languages, and sociology.

III. SOURCES OF DATA AND PROCEDURE

The majority of data for this study was obtained through an analysis of information forms completed by chairmen of departments, or their designated representative, coordinating graduate study in institutions offering twelve or more semester hours of graduate credit in industrial education and administering or supporting graduate degrees or six-year specialist certificates for industrial arts education personnel.

Many of the graduate programs studied did not differentiate between industrial arts education and vocational-industrial education in the basic degree or certificate requirements; however, variance could be expected in the elective part of an individual graduate student's program. Institutions were selected for study on the basis of the purpose of their graduate program, i.e. development of professional personnel for industrial arts education, rather than the specific degree title utilized. Programs designed for industrial arts education only and those which serve industrial arts education as well as one or more other phases of industrial education are included. The term "industrial arts education" is used in this study to describe programs which are both the "pure" and the "hybrid" varieties; however, no programs which were specifically designed for vocational-industrial education personnel are included.

Identification of the Population

A list of public and private colleges and universities having graduate programs in industrial education was compiled from the **Industrial Teacher Education Directory—Institutions and Personnel,**[2] 1963-64, and from abstracts and education reviews of master's and doctor's degrees granted and in progress. This procedure revealed a list of 122 institutions that probably offered graduate programs in industrial education in the United States.

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[2]G. S. Wall, compiler, **Industrial Teacher Education Directory—Institutions and Personnel,** A Joint Publication by the American Council on Industrial Arts Teacher Education and the National Association of Industrial Teacher Education (Menomonie, Wisconsin: Stout State College, 1963).

Copies of the printed information form, along with a letter explaining the purpose of the study, were sent to those persons who provide the leadership in industrial education graduate programs or to the chairmen of the departments in industrial education of the 122 institutions. Through this survey, it was found that sixteen of the institutions did not offer graduate programs for industrial arts education personnel and,therefore, were excluded from this study. The exclusion of these institutions reduced the population to 106 institutions. Completed information forms from 87 or 83.7 per cent of the institutions were analyzed in this study. Additional data were obtained from duplicated materials furnished by the respondents as well as from college and university catalogs.

The 87 institutions included in the study are located in 36 states of the United States. A list of the cooperating institutions with the names and titles of the respondents, is given in Appendix A.[3]

The data collected from the information forms, from written materials furnished by the respondents, and from college and university catalogs were then classified, tabulated, and arranged in a manner that would facilitate further analysis and interpretation.

IV. FINDINGS

The findings resulting from this study are reported in relation to the four basic functions of graduate education which served as the center of focus for the research effort. In addition, data relative to the organizational framework within which the functions are carried out were gathered and are herein reported.

A. Organizational Procedures and Practices

The purpose of this phase of the study was to ascertain the status of certain organizational procedures and practices of graduate programs offering degrees and certificates in industrial arts education as they relate to the four functions of graduate education. Those procedures and practices considered most appropriate for inclusion in this report are as follows: (1) types of graduate programs offered by institutions studied, (2) required hours for graduate degrees and certificates offered, (3) total graduate hours offered in industrial education technical and professional courses and (4) portion of student's program of study devoted to each of the four basic functions of graduate education.

Types of Graduate Programs Offered

As revealed in Table I, graduate programs limited to the master's degree were reported more frequently than any other type of graduate program in the 87 institutions cooperating in this study. This limited graduate program was offered in 72.41 per cent of the institutions

[3]A list of the cooperating institutions is given in Appendix A.

studied. The doctoral degree program was found to be a part of two different combinations: (1) those offering the master's and doctor's degrees together, and (2) those offering the master's degree, specialist certificate or degree, and doctor's degree together. Of the 87 reporting institutions, 16 offered the specialist program and 17 offered the doctoral program.

TABLE I

Types of Graduate Degree and Certificate Programs Offered In Industrial Education In Eighty-Seven Colleges And Universities in the United States

Types of Degree and Certificate Programs	Number	Per Cent
Master's degree programs only	63	72.41
Master's and doctor's degree programs	8	9.20
Master's degree, specialist, and doctor's degree programs	9	10.34
Master's degree and specialist programs	7	8.05
Total	87	100.00

Graduate Degrees and Certificates Offered

As indicated previously, the central focus of this study was on industrial arts education; however, it is interesting to note the other types of allied industrial graduate programs offered within the institutions studied.

Eleven different types of master's degrees, three types of specialist's programs, and two types of doctor's degrees were offered in industrial arts education by the cooperating institutions, as indicated in Table II.

Industrial arts education was found in 105 of the 107 master degree programs offered, vocational-industrial education in 47 degree programs, and technical education in 33 degree programs. Industrial arts education was found in all 16 specialist programs; whereas, vocational-industrial education and technical education were found in only 9 programs. Twenty-two doctor's degree programs were offered by the 17 responding institutions. Here, it is significant to note that although industrial arts education was represented in 21 programs, vocational-industrial education was represented in 18 programs, and technical education in 14 programs.

TABLE II

Graduate Degrees and Certificates Offered in the Three Types of Graduate Programs in Industrial Education at Eighty-Seven Colleges and Universities in the United States

Title of Graduate Degrees and Certificates Offered	Number of Institutions Reporting Each Title	Types of Programs		
		Industrial Arts Education	Vocatiional-Industrial Education	Technical Education
		No. Inst.*	No. Inst.	No. Inst.
Master of Science	31	31	17	16
Master of Education	28	28	13	8
Master of Arts	25	25	9	4
Master of Science in Education	6	5	1	
Master of Teaching	4	4		
Master of Industrial Education	3	3	2	1
Master of Arts in Industrial Arts	3	3		
Master of Science in Industrial Education	2	2	2	2
Master of Education in Industrial Arts	1	1		
Master of Science in Teaching	1	1	1	1
Master of Arts in Education	2	2	1	1
Master of Vocational Education	1		1	
Specialist or Six-year Certificate	8	8	6	5
Specialist of Education	5	5	2	2
Advance Diploma	3	3	1	2
Doctor of Education	13	12	10	8
Doctor of Philosophy	9	9	8	6
Total	145**	142	74	56

*Number of institutions reporting each type of degree or certificate

**Some institutions reported several different degree and certificate titles

Number of Hours Required for Graduate Degrees and Certificates Offered

As shown in Table III, the range of required hours was found to be quite broad wthin the master's, specialist, and doctoral programs. However, the mean number of required hours for the various degrees offered within the three types of graduate programs was found to vary only slightly.

In the 107 different master's degree programs, the range of hours required was from 24 to 40 semester hours; however, when the mean number of hours for each of the degrees was compared, the variation was less than 3 semester hours among all but one of the degree types.

In the 16 specialist's certificate programs, the range of required semester hours was between 54 and 80 with a mean of 62.30. In the three types of specialist's certificate programs, the mean number of required hours was found to vary by 7.33 semester hours.

As might be expected, the doctoral degree programs showed the greatest difference in the range of graduate semester hours required,

TABLE III
Mean Number of Hours Required* for Graduate Degrees and Certificates Offered in Industrial Education

Title of Graduate Degrees and Certificates Offered	Number Reported	Number of Semester Hours Required	
		Mean	Range
Master of Science	31	31.03	24-36
Master of Education	28	32.43	30-40
Master of Arts	25	29.92	24-32
Master of Science in Education	6	31.67	30-36
Master of Teaching	4	31.50	30-32
Master of Industrial Education	3	30.00	30-30
Master of Arts in Industrial Arts	3	30.67	30-32
Master of Science in Industrial Education	2	31.00	30-32
Master of Education in Industrial Arts	1	30.00	30-30
Master of Science in Teaching	1	30.00	30-30
Master of Arts in Education	2	30.00	30-30
Master of Vocational Education	1	38.00	38-38
Specialist or Six-year Certificate	8	66.00	60-80
Specialist of Education	5	60.20	54-65
Advance Diploma	3	58.67	54-62
Doctor of Education	13	84.46	64-101
Doctor of Philosophy	9	79.00	64-90
Total	145		-

*The required courses were offered in many different departments within the institutions.

from 64 to 101. This range was particularly evidenced in the Doctor of Education programs. The difference between the mean required hours for the Doctor of Education programs and the Doctor of Philosophy programs was found to be 5.46 semester hours. Only four of the institutions, having six of the doctoral programs, indicated that no hours of credit were given for the doctor's degree. The number of required hours in three of these four institutions was below the mean of the entire group which might indicate an attempt to take the student's total time into account; however, the required hours in the other institutions exceeded the mean even though no graduate credit was granted for the dissertation.

Total Number of Graduate Hours Offered in Industrial Education Courses

The number of graduate hours offered in industrial education courses in the 87 cooperating institutions in this study is indicated in Table IV. A breakdown of the technical courses, research courses, and professional industrial education courses will be presented in detail in parts B, C, and D of this report. It should be noted also that a limitation of this study was that a minimum of twelve semester hours of graduate courses in industrial education must have been offered in order for an institution to be included. Therefore, only those institutions meeting this limitation at the time of the study were included.

TABLE IV

Total Number of Graduate Hours Offered In Industrial Education Courses In Eighty-Seven Institutions

Semester Hours	Number	Per Cent
12-23	12	13.80
24-35	22	25.28
36-47	18	20.69
48-59	12	13.80
60-71	11	12.64
72-83	3	3.44
84, and over	9	10.35
Total	87	100.00

Range: 12-164 semester hours.

Mean: 48.95 semester hours, calculated from raw data.

The range of semester hours offered in graduate courses in industrial education was from 12 to 164 hours, with a mean of 48.95 semester hours. No attempt was made to list only industrial arts education graduate offerings since it was felt that the entire group of departmental course offerings would represent the pool of experiences from which certain courses for individual graduate programs would be drawn.

Relative Emphasis upon the Four Basic Functions of Graduate Education

Table V is structured so as to reveal the status of the graduate programs in relation to the development of specialized technical competencies, research competencies, and teaching and administrative competencies, along with provisions for general and liberal education. The statistical data in this table are based on returns from 87 institutions offering the master's program, 16 institutions offering the specialist program, and 17 institutions offering the doctoral program. The respondents were asked to provide an estimate of the typical student's program rather than to provide an average of programs for a given period of time.

TABLE V

Portion of Graduate Student's Program of Study Devoted To The Four Basic Functions Of Graduate Education

Functions of Graduate Education	Types of Graduate Programs					
	Master's Program*		Specialist Program**		Doctoral Program***	
	Mean Per Cent	Range	Mean Per Cent	Range	Mean Per Cent	Range
Specialized technical competencies	24.94	0-70	27.73	0-50	11.90	0-35
Research competencies	16.79	0-35	17.10	0-30	25.88	10-50
Teaching and administrative competencies	43.79	15-90	40.26	15-90	41.48	25-70
General and liberal education	14.48	0-40	14.91	0-50	20.74	0-40

*Based on returns from 87 institutions.
**Based on returns from 16 institutions.
***Based on returns from 17 institutions.

The range in most categories was rather broad. This broad difference showed up the most in specialized technical competencies and teaching competencies, within the master's program. In the specialist program, the wide range of difference was revealed in the teaching and administrative competencies, 15 to 90 per cent. The doctoral program revealed less differences in range than the master's and specialist programs. Every responding institution indicated some emphasis on the development of teaching and administrative competencies for all three levels of graduate degree and certificate programs offered

The greatest difference in a mean per cent was revealed in the specialized technical competencies where a sharp decrease was evident in the doctoral program, 11.90 per cent, compared with the master's programs, 24.94 per cent, and the specialist programs 27.73 per cent. As might be expected, the doctoral program revealed the largest per cent of time to developing research competencies, 25.88 per cent. Very little difference existed in the mean per cent of time devoted to developing teaching and administrative competencies, only 3.53 per cent among the three graduate level degree and certificate programs. General and liberal education courses were more prevalent in the doctoral programs, 20.74 per cent, than in the master's programs, 14.48 per cent, or in the specialist programs, 14.91 per cent.

B. Development of Specialized Technical Competencies

This phase of the study sought to ascertain the provisions and practices, within graduate programs preparing personnel for industrial arts education, which were designed to develop technical skills and related knowledge. Those provisions and practices considered most appropriate for inclusion in this report are as follows: (1) graduate hours offered in technical courses; (2) required hours, recommended hours, and maximum graduate hours accepted in technical courses; (3) adequacy of tools, materials, and facilities available; and (4) availability of shops and laboratories.

Graduate Hours Offered in Technical Courses

Seventeen of the 87 institutions offering graduate degrees and certificates for industrial arts education personnel reported that no technical course work was offered at the graduate level. Instruction in seventeen technical areas was reported by the 70 institutions providing technical courses for graduate students.

The course areas offered most frequently by the majority of the institutions were: metals, 60; electricity and electronics, 55; drafting and design, 53; and woods, 47. The range of technical course areas within the institutions reporting was from 1 to 11. The mean number of reported technical areas offered was 5.49.

The specialized technical areas showed an extensive range of semester hours offered. The greatest range in hours offered was in electricity and electronics, 2 to 30 hours. This was followed by metals, 2 to 27

hours. Small differences were revealed in the mean number of course hours offered in the various technical areas. Of the six technical areas most frequently offered, metals was reported to be the area with the highest mean number of hours, 6.83. This was followed closely by electricity and electronics, with a mean of 6.16 hours. The area with the lowest mean number of technical hours offered was in leathercraft, 2.71.

Of the total number of hours offered in all 17 technical areas, the mean was 5.36 hours per area. The mean number of graduate hours offered in technical courses in industrial education, in the 70 institutions reporting technical course work, was 29.43.

TABLE VI

Number of Semester Hours Offered in Technical Courses at the Graduate Level

Technical Course Areas	Number of Institutions Reported	Number of Semester Hours Offered	
		Range	Mean*
None	17		
Metals, all forms	60	2-27	6.83
Electricity, electronics	55	2-30	6.16
Drafting and design	53	2-15	5.36
Woods, all forms	47	2-15	5.23
Power and transportation	33	2-15	5.17
Graphic arts	30	2-15	4.93
Plastics	16	2-8	5.08
Leathercraft	14	1-4	2.71
Crafts, general shop	14	2-6	3.60
Building construction	14	2-8	4.13
Ceramics	13	2-6	3.97
Photography	13	2-15	4.01
Special problems	9	3-12	6.67
Textiles	4	3-9	5.25
Experimental laboratory	4	3-15	7.75
Shop maintenance	3	3-4	3.33
Jewelry	2	3-5	4.00

*Mean number of semester hours offered by institutions providing instruction in a given technical area.

Mean, per area	5.36
Mean number of technical areas for 70 institutions	5.49
Mean number of course hours for 70 institutions	29.43

Required Graduate Hours in Technical Courses

Table VII reveals that a majority of institutions do not require technical course work in any one of the three graduate degree or certificate programs offered.

The range of required hours in technical courses for 120 graduate programs within 87 institutions was from 0 to 20. The mean number of hours in technical courses for the 37 institutions offering master's programs and reporting required hours was 9.33. However, the mean for all 87 institutions offering master's degrees was 3.97 semester hours. For the 7 specialist's certificate programs requiring hours, the mean was 13.86 with a mean of 6.06 for all 16 specialist's certificate programs.

Recommended Graduate Hours in Technical Courses

Responses from a majority of the 87 institutions revealed that the leadership responsible for the 120 graduate programs studied recommended technical courses for inclusion in the graduate program of individual students. This advisement practice differs markedly with the reported practice relative to required course work in technical areas.

Respondents from 72 of the 87 institutions offering master's degrees recommended hours in technical course work, as revealed in Table VIII. It should be noted that in 28 master's programs, from 5 to 6 hours of technical course work was recommended.

The range of recommended hours was from 0 to 20 in the master's

TABLE VII
Number of Semester Hours of Technical Courses Required for Graduate Degrees and Certificates

	Types of Graduate Programs			
Required Hours	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	50	9	14	73
3-4	7		1	8
5-6	6	1		7
7-8	5			5
9-10	7	1		8
11-12	4	2		6
13-14	2			2
15-16	2			2
17-18	2	1	2	5
19-20	2	2		4
Total	87	16	17	120
Range	0-20	0-20	0-18	0-20
Mean	9.33*	13.86**	13.00***	10.23****

*Based on returns from 37 institutions requiring hours.
**Based on returns from 7 institutions requiring hours.
***Based on returns from 3 institutions requiring hours.
****Based on returns from 47 institutions requiring hours.

programs, 0 to 22 in the specialist programs, and 0 to 33 in the doctoral programs. In the 72 institutions reporting recommended hours for the master's programs, the mean was 8.88. In 9 specialist programs and 6 doctoral programs reporting recommended hours, the mean was 15.00.

TABLE VIII

Number of Semester Hours in Graduate Level Technical Courses Recommended for Graduate Students

Recommended Hours	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	15	6	10	31
1-2	1		1	2
3-4	9			9
5-6	28			28
7-8	5		2	7
9-10	5	2		7
11-12	9	1	1	11
13-14	4	2		6
15-16	5	2		7
17-18	2		1	3
19-20	4	1		5
21 and over		2	2	4
Total	87	16	17	120
Range	0-20	0-22	0-33	0-33
Mean	8.88*	15.00**	15.00***	10.44****

*Based on returns from 72 institutions recommending hours.
**Based on returns from 10 institutions recommending hours.
***Based on returns from 7 institutions recommending hours.
****Based on returns from 89 institutions recommending hours.

Maximum Number of Semester Hours of Graduate Level Technical Course Work Accepted

Respondents from 106 of the 120 graduate programs indicated that semester hours in technical courses were accepted for graduate credit, as shown in Table IX. Responses from 19 graduate programs indicated that the maximum number of hours in technical courses was not specified.

The master's programs revealed a range of maximum accepted hours of between 0 and 32. The specialist programs maximum range of accepted hours was from 0 to 30. The range of maximum accepted hours in technical courses in the doctoral program was between 0 and 45.

For the 70 master's programs in which the respondents reported

maximum hours of technical course work, the mean was 11.40. The 10 specialist programs revealed a mean of 16.60 maximum accepted hours. Respondents from 6 doctoral programs indicated that the maximum accepted hours were not specified. However, in the 6 doctoral programs reporting maximum accepted hours for technical course work, the mean was 17.86. For the 87 graduate programs reporting, the mean number of technical course hours accepted for graduate credit was 12.52 semester hours.

Adequacy of Tools, Machines, and Facilities

Table X reveals data reported for the 87 institutions responding with respect to the adequacy of tools, machines, and facilities available in the technical areas of industrial education as judged by the respondents. Approximately 39 per cent of the respondents indicated that they believed the tools, machines, and facilities in their departments to be "very adequate" for use by the graduate students in industrial education, while another 39 per cent indicated that these facilities were "adequate." Thus, 78.16 per cent of the respondents believed the physical aspects of their technical areas to be average or above.

TABLE IX

Maximum Number of Graduate Hours in Technical Courses Accepted for Graduate Credit

	Types of Graduate Programs			
Maximum Hours	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	8	2	4	14
Not specified	9	4	6	19
1-3	2		1	3
4-6	12	2	1	15
7-9	18			18
10-12	16	2	2	20
13-15	4	2		6
16-18	13			13
19-21	3		1	4
22-24	1	2		3
25 and over	1	2	2	5
Total	87	16	17	120
Range	0-32	0-30	0-45	0-32
Mean	11.40*	16.60**	17.86***	12.52****

*Based on returns from 70 institutions reporting hours.
**Based on returns from 10 institutions reporting hours.
***Based on returns from 7 institutions reporting hours.
****Based on returns from 87 institutions reporting hours.

TABLE X

Adequacy of Tools, Machines, and Facilities Available In Technical Areas for Graduate Students

Degrees of Adequacy	Number	Per Cent
Very adequate	34	39.08
Average (adequate)	34	39.08
Very little (fairly adequate)	10	11.50
Not adequate	5	5.74
Does not apply	4	4.60
Total	87	100.00

Availability of Shops and Laboratories

The availability of shops and laboratories for graduate students in industrial education is indicated in Table XI. The most frequently checked response was "generally available," with 37.93 per cent reporting.

TABLE XI

Availability of Industrial Education Shops and Laboratories for Graduate Students

Degrees of Availability	Number	Percent
Always available	19	21.84
Generally available	33	37.93
With permission only	20	22.99
With teacher present only	9	10.35
Never available	2	2.30
Does not apply	4	4.59
Total	87	100.00

Another 21.84 per cent indicated that the shop and laboratories were "always available" to graduate students in industrial education. Of the remaining responses, 22.99 per cent indicated that the shops and laboratories were available "with permission only."

C. Development of Research Competencies

This phase of the study attempted to assess the provisions and practices which provide graduate students the opportunity to develop competencies necessary for conducting and/or interpreting research. The

provisions and practices considered appropriate for inclusion in this report are as follows: (1) graduate hours offered in research courses; (2) required graduate hours in research courses; (3) per cent of graduate students in each degree program actually involved in research work; (4) classification of research studies; (5) research facilities, aids, and resources available; and (6) research assistantships available and the amount of the stipends.

Graduate Hours Offered in Research Related Courses

The 87 cooperating institutions reported courses or areas of course work for graduate credit in research methods, problems, and statistics, as indicated in Table XII. Research methods and techniques were offered by 80 institutions. Both research problems and beginning statistics were offered in 55 institutions. It is significant to note that only 64 of the 87 master's degree programs offered course hour credit for the master thesis. Also, only 14 of the 17 doctoral degree programs offered course credit for the dissertation.

TABLE XII

Number of Graduate Hours Offered in Research Courses

Research and Statistics Courses	Number of Institutions Offering	Number of Semester Hours Offered	
		Range	Mean
Research methods and techniques	80	1-12	3.81
Research problems	55	1-20	5.07
Statistics, beginning	55	1-9	3.26
Statistics, advanced	32	2-20	4.69
Scholarly paper	27	2-8	3.70
Master's thesis	64	2-8	5.06
Doctoral dissertation	14	10-24	13.71

The range of hours offered in research courses or areas of courses varied extensively. The range in the area of research problems was from 1 to 20 semester hours. The mean number of hours offered in research problems was 5.07 for the 55 institutions. In research methods and techniques, the range was between 1 and 12 hours, with a mean of 3.81 hours. Graduate hours offered for the master's thesis ranged from 2 to 8, with a mean of 5.06. The doctoral dissertation, offered for credit, ranged from 10 to 24 hours. The mean number of hours offered for credit in the dissertation was 13.71.

Required Hours in Graduate Research Courses

As indicated in Table XIII, 70 of the 87 cooperating institutions reported required hours in research methods and techniques for the

TABLE XIII

Number of Hours in Research Courses Required in Institutions Preparing Personnel for Industrial Arts Education

Research and Statistics Courses	Types of Graduate Programs								
	Master's Program			Specialist Program			Doctoral Program		
	No. Inst.*	Req. Hours		No. Inst.	Req. Hours		No. Inst.	Req. Hours	
		Range	Mean		Range	Mean		Range	Mean
Research methods and techniques	70	2-6	2.96	12	2-6	3.83	14	2-12	4.21
				8	2-6	3.63	10	2-8	4.60
Research problems	35	1-6	3.17	8	2-6	3.25	13	2-6	3.54
Statistics, beginning	28	2-4	2.64	4	3-7	4.00	12	2-7	4.50
Statistics, advanced	4	2-3	2.50	8	2-6	3.50			
Scholarly paper	15	2-6	3.07	4	2-6	4.25			
Master's thesis	43	2-6	4.70				12	6-15	10.08
Doctoral dissertation									

*Number of institutions reporting required hours.

master's degree program. The range of required hours in research methods and techniques was from 2 to 6. The mean of such required hours was 2.93. In 43 institutions reporting required hours for the master's thesis, the range was between 2 and 6 hours. The mean for the master's thesis was 4.70 required hours.

The respondents in 12 specialist programs indicated required hours in research problems and techniques. The range for these courses was from 2 to 6 required hours. The mean number of required hours was 3.83. A total of 12 institutions indicated that either a scholarly paper or a master's thesis was required of their candidates for the specialist certificate or degree.

Fourteen institutions reported that they required of their doctoral candidates course work in research methods and techniques. The range for these courses was from 2 to 12 required hours. As one might expect, the mean number of required hours in research methods and techniques for the doctoral degree program was more than in the master's and specialist programs, 4.21 semester hours. Also, the number of institutions requiring course work in research problems, beginning statistics, and advanced statistics was higher, in the doctoral programs than in the

TABLE XIV

Per Cent of Students in Graduate Programs Actually Preparing a Thesis or Dissertation

Percentage of Students Writing	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	19	5		24
1-10	33	1		34
11-20	5			5
21-30	4			4
31-40	2	1		3
41-50	2			2
51-60	1			1
61-70		1		1
71-80	3			3
81-90	4			4
91-100	14	8	17	39
Total	87	16	17	120
Range	0-100	0-100	——	0-100
Mean	30.11*	57.19**	100.00***	43.63****

*Based on returns from 87 institutions reporting.
**Based on returns from 16 institutions reporting.
***Based on returns from 17 instiutions reporting.
****Based on returns from 120 institutions reporting.

master's and specialist programs. Twelve institutions reported required semester hours for the doctoral dissertation, ranging from 6 to 15, with a mean of 10.08.

Actual Involvement of Graduate Students in Research

The frequencies listed in Table XIV reveals the two extremes in the percentage of students preparing a formal research report. Respondents from 58 of the 120 graduate programs indicated that not more than 10 per cent of the students prepared a research report. Respondents from 39 graduate programs indicated that 91 per cent or more of the students prepared a research report. Only 23 respondents indicated percentages between 11 and 90 per cent.

The range of percentages of students who wrote a thesis was from 0 to 100 in the master's and specialist programs. The mean for the master's programs was 28.72 per cent, and for the specialist programs it was 54.33 per cent.

In the doctoral programs, it was reported that all the students who meet degree requirements write a dissertation.

Classification of Research Studies Completed (1958-63)

As revealed in Table XV, respondents from 23 institutions offering master's programs, 5 from institutions offering specialist programs, and 2 from institutions offering doctoral programs reported that no research studies in industrial education were completed at their institutions between 1958 and 1963. A majority of the research studies that were done in the remaining institutions were of the descriptive type.

TABLE XV

Number of and Classification of Research Studies Completed By Graduate Students Between 1958 and 1963

Classification of Studies	Types of Graduate Programs							
	Master's Program		Specialist Program		Doctoral Program		All Programs	
	No. Inst.*	No. Stud.**	No. Inst.	No. Stud.	No. Inst.	No. Stud.	No. Inst.	No. Stud.
None reported	23		5		2		30	
Historical	32	160			5	16	37	176
Descriptive	60	991	1	1	12	66	73	1058
Experimental	40	276	1	2	10	33	51	311
Total		1427		3		115		1545

*Number of institutions reporting.
**Number of research studies reported.

In the master's programs, 1427 research studies were reported—160 historical, 991 descriptive, and 276 experimental. In the specialist programs, only 3 research studies were reported. In the doctoral programs, 115 research studies were reported—16 historical, 66 descriptive, and 33 experimental. For all graduate programs reported by the respondents, a total of 1545 research studies were completed between 1958 and 1963.

Research Facilities, Aids, and Resources

The number and types of research facilities, aids, and resources are presented in Table XVI, as being available to graduate students in the 87 institutions offering graduate work in industrial arts education. A total of 15 different types of research services and facilities were reported by the respondents from the cooperating institutions.

The two research services most frequently indicated as being available were the "college library" and "audio visual equipment," 100.00 per cent and 95.40 per cent, respectively. Over half of the institutions reported that a departmental library, a computer center and programming, calculators, photography and printing, an educational testing center, as well as local schools and shops were available for use by graduate students engaged in research purposes.

Only 27.59 per cent of the institutions indicated that a testing laboratory was available in the industrial education department. Another 39.09 per cent of the respondents indicated that laboratories in other departments were available to graduate students in industrial education.

TABLE XVI

Research Facilities, Aids and Resources Available To Graduate Students In Institutions Studied

Facilities, Aids and Resources	Number	Per Cent
College library	87	100.00
Audio visual equipment	83	95.40
Departmental library	60	68.97
Computer center and programming	55	63.22
Photography and printing service	53	60.92
Calculators	52	59.77
Educational testing center	49	56.32
Local schools and shops	49	56.32
Laboratories in other departments	34	39.09
Typing and secretarial service	30	34.48
Testing laboratory in industrial education department	24	27.59
Curriculum center	4	4.60
All research resources of college	2	2.30
Self learning center	1	1.15
Consultant center	1	1.15

Research Assistantships

Of the 87 institutions cooperating in this study, 40 reported the availability of research assistantships for graduate students in industrial education. Fourteen institutions indicated that they had one research assistantship per year and 12 institutions reported two such assistantships, as revealed in Table XVII.

TABLE XVII
Number of Research Assistantships Available

Number of Assistantships	Number	Per Cent
None	47	54.02
One	14	16.09
Two	12	13.79
Three	5	5.75
Four	3	3.45
Five	2	2.30
Six or more	4	4.60
Total	87	100.00

Range, 0-20 assistantships.
Mean number of assistantships per institution reporting was 2.93.

TABLE XVIII
Stipends and Number of Research Assistantships

Amount of Stipends*	Number of Institutions Reported	Number of Research Assistantships	Mean Amount Available Per Institution
$ 500 to $ 699	1	1	$ 600.00
700 to 899	1	1	800.00
900 to 1,099	6	19	3,136.67
1,100 to 1,299	3	6	2,410.00
1,300 to 1,499	2	4	2,625.00
1,500 to 1,699	5	7	2,160.00
1,700 to 1,899	8	24	5,300.00
1,900 to 2,099	5	9	3,600.00
2,100 to 2,299	3	12	8,754.00
2,300 to 2,399	2	6	7,000.00
2,400 to 2,499	1	1	2,400.00
2,500 to 2,599	2	25	31,250.00
2,600 to 2,900	1	2	5,800.00
Total	40	117	

Range, per assistantship — $600 to $2,900
Mean, per assistantship — $1921.90
*Based on nine or ten months.

It should be noted that of the 4 institutions indicating six or more research assistantships, two reported 7 and one reported 20. The range of research assistantships available was between 0 and 20. The mean number of research assistantships per institution for the 40 institutions reporting was 2.93.

Table XVIII was structured to indicate the relationship between the number of research assistantships available, the number of institutions reporting same, and the amount of money available per institution for nine or ten month stipends for research assistantships.

The 40 institutions reported 117 research assistantships available for graduate students. Six institutions reported that they had a total of 19 assistantships in the $900 to $1,099 interval. Eight institutions reported a total of 24 assistantships paying between $1,700 and $1,899, and 3 institutions reported 12 assistantships paying between $2,100 and $2,299. Of special significance were the 6 institutions which reported a total of 34 assistantships paying over $2,300 each. The largest mean amount of money per institution, $14,116.67 was among the 6 institutions in the $2,300 and over stipend interval.

The range for 117 reported research assistantships in 40 institutions was from $600 to $2,900. The mean amount per assistantship was $1,921.90. Generally the institutions with higher stipends provided the greater number of research assistantships, and in turn had the greatest amount of money available for research assistants per institution.

D. Development of Teaching and Administrative Competencies

This phase of the report presents selected provisions and practices which have been designed to provide opportunities to develop teaching and administrative competencies through graduate study. In institutions offering graduate study specifically to prepare and upgrade personnel in industrial arts education, the opportunities to develop these competencies are provided through professional education courses and other experiences in departments of industrial arts, industrial education, as well as in departments, schools and colleges of education.

The provisions and practices considered most appropriate for inclusion in this report are as follows: (1) graduate hours offered in industrial education professional courses; (2) required graduate hours in professional industrial education courses; (3) recommended graduate hours in professional industrial education courses; (4) teaching experience required, and intern or on-campus teaching required; (5) available teaching positions, and part-time teaching for graduate students pursuing graduate work; and (6) required graduate hours in professional education courses other than industrial education.

Due to two factors, (1) that many institutions offer graduate work for personnel in vocational-industrial education as well as those in industrial arts education, and (2) that course work in these two related fields are frequently combined within a graduate student's program,

the data relative to professional course work is grouped under the descriptive heading of "professional courses in industrial education."

Professional Industrial Education Courses Offered for Graduate Credit

Respondents of the 87 institutions involved in this study reported a total of 490 professional courses or areas of course work offered for graduate credit in industrial education. For the purpose of this study, professional courses in industrial education were classified into 10 areas, as revealed in Table XIX.

The curricular areas offered most frequently were: "history and philosophy," 79; "curriculum content and construction," 71; "administration and organization or programs and facilities," 65; "instructional methods, techniques, and evaluation," 65; and "seminars, problems, and current writings," 64. All 87 institutions cooperating in the study offered professional courses in industrial education. The mean number of reported curricular areas offered, per institution, was 5.63.

TABLE XIX

Total Number of Graduate Hours Offered in Industrial Education Professional Courses

Industrial Education Professional Courses	Number of Institutions Offering	Number of Semester Hours Offered	
		Range	Mean
History and philosophy	79	2-10	3.51
Curriculum; content and construction	71	2-16	4.61
Administration and organization of programs and facilities	65	2-21	6.62
Instruction; methods, techniques and evaluation	65	2-16	5.57
Seminars, problems and current writings	64	1-17	5.20
Analyses and surveys	34	1-11	3.68
Industry; tools, materials and processes	35	1-29	7.17
Vocational-industrial programs	31	1-34	9.42
Visual and other teaching aids	31	1-10	3.94
Public and industrial relations	15	1-7	3.33
Total	490		
Range		1-34	

Mean number of areas offered — 5.63, per institution.
Mean number of course hours offered — 29.50, per institution.

The semester hours offered in the various areas ranged from as few as 1 to as many as 34. This range was evident in the area of "vocational-industrial programs." Some differences were revealed in the mean number of hours offered in the 10 areas of professional course work in industrial education. The highest mean number of hours offered was in the area of "vocational-industrial programs," 9.42 semester hours. In "history and philosophy," the area reported by the most institutions, the mean number of hours offered was 3.51. Of the five curricular areas most frequently offered, the area of "administration and organization of programs and facilities" revealed the highest mean number of semester hours offered. The lowest mean number of hours offered was in the area of "public and industrial relations."

The mean number of graduate semester hours offered in professional courses in industrial education with all areas combined for the 87 institutions was 29.50.

Professional Industrial Education Courses Required of Graduate Students

Table XX reveals an extensive range of institutions requiring graduate hours in professional courses in industrial education. In the 87 master's programs, the most frequently required curricular areas were: "history and philosophy," 56; "administration and organization," 50; and "curriculum content and construction," 49. Only 3 institutions required course work in public and industrial relations.

The greatest range of required hours in the master's programs was in the area of "seminars, problems and current writings." Little difference existed between the mean required hours in each area within institutions requiring course work in each curricular area. The lowest mean number of required hours was in "public and industrial relations," 2.33; the highest mean was in "industry, tools and materials," 3.75.

In the specialist programs, 10 of the 16 institutions reported required hours in "curriculum content and construction." "History and philosophy" were required by 9 institutions; "administration and organization" by 8; and "seminars, problems, and writings" by 8. The overall range of required hours was from 1 to 12. The highest mean number of required hours was 6.17, in "industry, tools and materials."

Thirteen of the 17 institutions reporting a doctoral program required course work in "curriculum content and construction" and in "history and philosophy." Twelve institutions required course work in "administration and organization," and "seminars and problems." The range of required hours was the greatest, from 2 to 12, in "seminars and problems." The mean required hours for "vocational-industrial programs" was the highest, 5.60 hours. Five of the areas revealed a mean of four or more required hours.

TABLE XX

Number of Required Hours in Industrial Education Professional Courses

Industrial Education Professional Courses	Types of Graduate Programs								
	Master's Program			Specialist Program			Doctoral Program		
	No. Inst.*	Req. Hours		No. Inst.	Req. Hours		No. Inst.	Req. Hours	
		Range	Mean		Range	Mean		Range	Mean
History and philosophy	56	2-6	3.00	9	3-6	3.77	13	2-6	3.85
Curriculum; content and construction	49	2-6	3.06	10	3-6	3.80	13	2-6	3.38
Administration and organization of programs and facilities	50	2-8	3.42	8	2-6	3.75	12	2-8	4.00
Instruction; methods, techniques and evaluation	35	2-6	3.00	7	3-6	4.00	10	2-9	4.50
Seminars, problems and current writings	37	1-9	2.78	8	1-6	3.00	12	2-12	5.08
Analysis and surveys	16	1-6	2.94	5	1-6	3.60	8	2-6	3.50
Industry; tools, materials and processes	12	2-6	3.75	6	3-12	6.17	2	3-6	4.50
Vocational-industrial programs	12	2-6	3.00	4	3-6	5.00	5	4-10	5.60
Visual and other teaching aids	9	1-5	2.67				4	2-2	2.00
Public and industrial relations	3	2-3	2.33	1	3-3	3.00	2	3-3	3.00

*Number of institutions reporting required hours.

Professional Industrial Education Courses Recommended for Graduate Students

As Table XXI reveals, all of the respondents for the 120 graduate programs reported that professional courses in industrial education were recommended to be taken by graduate students. The range of recommended hours was from 4 to 26 in the master's programs; 10 to 35 in the specialist program; and 16 to 45 in the doctoral programs. In the master's programs the mean number of recommended hours was 12.72. In the specialist program the mean was 20.38 hours. In the doctoral program the mean was 27.94 recommended hours in professional courses in industrial education. The recommended hours are cumulative rather than additive and represent the total of each degree or certificate program.

Teaching Experience Required

Respondents from 48 of the 120 graduate programs in the 87 institutions studied indicated that teaching experience was required of the students prior to the granting of graduate degrees and certificates. Twenty-four of the 87 master's programs required teaching experience;

TABLE XXI

Recommended Number of Graduate Hours in Industrial Education Professional Courses To Be Taken By Graduate Students

Recommended Hours	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
4-6	14			14
7-9	20			20
10-12	17	2		19
13-15	6	2		8
16-18	15	2	2	19
19-21	7	1	1	9
22-24	6	4	2	12
25-27	2	2	2	6
28-30		1	2	3
31-33			1	1
34-36		2	3	5
37 and over			4	4
Total	87	16	17	120
Range	4-26	10-35	16-45	4-45
Mean	12.72	20.38	27.94	15.90

Note: Mean and range relate to the total number of institutions responding.

TABLE XXII
Teaching Experience Required Prior To Granting Graduate Degrees and Certificates

Required Years	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
Not required	63	5	4	72
One year	15	1		16
Two years	7	2	3	12
Three years	2	8	10	20
Total	87	16	17	120

15 required one year of experience; 7 required two years of experience; and 2 required three years of experience. Eleven of the specialist programs required teaching experience, of which 8 required three years.

In the doctoral programs, 4 of the 17 institutions did not require teaching experience prior to granting the degree. Four institutions required two years of teaching experience, and 10 institutions required three years of teaching experience.

It should be noted here that several respondents indicated that teaching experience was "not required," but believed it necessary to write out such comments as "but desirable," "but encouraged," and "highly recommended." These replies are perhaps indicative of the belief that those students having teaching experience probably profit more from their graduate work than those without such experience.

TABLE XXIII
Amounts Of Intern Or On-Campus Teaching Required Prior To Granting Graduate Degrees and Certificates

Amounts of Intern or On-campus Teaching	Types of Graduate Programs			
	Number of Master's Programs Requiring	Number of Specialist Programs Requiring	Number of Doctoral Programs Requiring	Number of All Programs Requiring
Not required	85	15	15	115
One class, one semester	1			1
Two classes, one semester	1			1
One class one year		1	2	3
Total	87	16	17	120

Intern On-Campus Teaching Required

As revealed in Table XXIII, intern or on-campus teaching is practically a non-existent accommodation to the development of teaching competencies. Only 5 of the respondents from the 120 graduate programs of 87 institutions reported that a form of intern or on-campus teaching was required.

Teaching Positions Available to Graduate Students

Table XXIV reveals information concerning the opportunity that exists for graduate students to obtain full or part-time positions in teaching or administration while pursuing graduate degrees. It should be noted here that 24 institutions reported that no teaching positions of any kind were available for graduate students pursuing graduate degrees.

TABLE XXIV

Opportunities Existing for Full or Part-Time Teaching Positions For Graduate Students

Teaching Opportunities	Frequency*	Per Cent**
None	24	27.59
Instructor's assistant	47	54.02
Teaching positions in local public schools	33	37.93
Instructor in industrial education	22	25.28
Graduate fellowship	8	9.20
Instructor in other departments	7	8.05
Instructor in education	7	8.05
Administrative assistant	4	4.60

*Some respondents indicated more than one item.

**Per Cent of the 87 institutions having certain opportunities available.

Of the 63 institutions reporting available positions, the type of position most frequently indicated was that of "instructor's assistant" which was available in 47 institutions. Thirty-three of the 63 institutions reporting teaching positions indicated that "teaching positions in local public schools" were available. Also, 22 institutions provided teaching positions as "instructor in the industrial education department." The other four types of full or part-time teaching and administrative positions were reported by 8 or less institutions. It might be noted that several respondents indicated teaching opportunities available in three or more areas or types of positions.

Required Graduate Hours in Professional Education Courses in Areas Other Than Industrial Education

Graduate students in industrial education are required to take relatively few specific courses in professional education other than industrial education, as indicated in Table XXV. In the 87 master's programs, the most frequently required course areas in professional education were "educational psychology," "history and philosophy," and "secondary instruction and curriculum." "Elementary administration and organization" and "educational services" were not required in any of the 87 programs. "Special education" was required in only one institution. Of the three areas required by the largest number of institutions, (1) "educational psychology" revealed a range of required hours of from 2 to 4, with a mean of 2.82; (2) "history and philosophy," a range of from 2 to 6, with a mean of 3.04; and (3) "secondary instruction and curriculum" a range of from 2 to 9, with a mean of 3.55.

In the specialist program, only five course areas were indicated as being required. Four institutions required course work in "history and philosophy," and 3 institutions required course work in "educational psychology."

In the doctoral programs, eight course areas were reported as being required. Four institutions required "history and philosophy." The areas of "administration of school systems," "educational psychology," and "secondary instruction and curriculum" were required by 3 institutions. The mean number of required hours in "educational psychology" was greatest at 5.67 semester hours.

E. Provisions for Graduate Level General and Liberal Education

The purpose of this chapter is to present the provisions and practices in departments with graduate programs for industrial arts education personnel which relate to opportunities for extending the general and liberal education of graduate students. For purpose of this study, these areas were considered to include all graduate courses offered by a college or university except those courses in industrial education and the professional education courses offered by the department, school or college of education.

The provisions and practices for general and liberal education selected for inclusion in this report are as follows: (1) recommended course areas of general and liberal education courses, (2) required graduate hours in general and liberal education courses, and (3) recommended graduate hours in general and liberal education courses.

Recommended Content Areas of General and Liberal Education Courses

As indicated in Table XXVI, respondents from 64 of the 87 cooperating institutions involved in this study recommended courses or areas

TABLE XXV

Number of Required Hours in Professional Education Courses For Graduate Students

Professional Education Courses	Types of Graduate Programs: Master's Program No. Inst.*	Master's Program Req. Hours Range	Master's Program Req. Hours Mean	Specialist Program No. Inst.	Specialist Program Req. Hours Range	Specialist Program Req. Hours Mean	Doctoral Program No. Inst.	Doctoral Program Req. Hours Range	Doctoral Program Req. Hours Mean
Secondary instruction and curriculum	20	2-9	3.55	2	3-3	3.00	3	2-6	3.33
History and philosophy	23	2-6	3.04	4	2-6	3.50	4	3-6	3.75
Guidance and counseling	11	2-6	3.27	0			1	4-4	4.00
Educational psychology	22	2-4	2.82	3	2-3	2.67	3	2-11	5.67
Secondary administration and organization	10	2-9	3.80	0			2	2-5	3.50
Administration of school systems	12	2-4	2.75	0			3	3-4	3.67
Elementary administration and organization	00			0			0		3.67
Elementary instruction and curriculum	4	2-2	2.00	0			0		
Special education	1	3-3	3.00	1	3-3	3.00	1	3-3	3.00
Higher education	6	2-8	3.83	2	3-3	3.00	2	3-4	3.50
Educational services; audio visual, library science	0			0			0		

*Number of institutions reporting required hours.

of course work in general and liberal education subject-matter. The recommended courses and areas of course work were in 16 different subject-matter areas or departments of the colleges and universities.

The area of psychology appeared to be recommended far more frequently than any of the other areas. Forty-nine of the 87 respondents indicated this area. Course work in sociology, recommended by thirty respondents, was the second most frequently reported area. Other recommended areas of general and liberal education course work reported by 15 or more of the respondents were economics, mathematics, philosophy, art, history, engineering, and business.

TABLE XXVI

Recommended Content Areas In General And Liberal Education Taken By Graduate Students

General and Liberal Education Areas	Number	Per Cent*
None, or not specified	23	26.44
Psychology	49	56.32
Sociology	30	34.48
Economics	26	29.89
Mathematics	23	26.44
Philosophy	22	25.28
History	21	24.15
Art	20	22.99
Engineering	19	21.84
Business	15	17.24
Physics	10	11.50
Geography	8	9.20
English	5	5.75
Biology	1	1.15
Drama	1	1.15
Journalism	1	1.15
Labor and Industrial Relations	1	1.15

*Per Cent of the 87 institutions reporting.

Graduate course work in English was recommended by only 5 respondents. Two course areas that appear to be unusual recommended areas for graduate students in industrial education were biology and drama. The range of recommended course areas reported by the 64 respondents was from one to nine.

Required Course Work in General and Liberal Education

As indicated in Table XXVII, 45 of the respondents for the 120 graduate programs reported required hours in general and liberal education courses. For the master's programs, 30 of the respondents reported required hours. The number of required hours ranged from 2 to

15. The overall range of required hours for the 87 institutions offering master's programs was between 0 and 15, with a mean of 2.17.

For the specialist programs, seven of the respondents reported required hours in general and liberal education courses. The range of required hours was from 0 to 15, with a mean of 3.94.

Eight of the 17 respondents from doctoral programs reported required hours in general and liberal education courses. In the eight institutions reporting required hours, the number varied between 9 and 24. The range of required graduate hours for the 17 institutions offering doctoral programs was from 0 to 24, with a mean of 7.35. For all 120 graduate programs in industrial education, the mean number of required hours was 3.14.

TABLE XXVII

Number Of Required Semester Hours In General And Liberal Education

Required Hours	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	57	9	9	75
1-2	2			2
3-4	8	1		9
5-6	9	1		10
7-8	4	1		5
9-10	5	2	2	9
11-12	1		1	2
13-14		1	1	2
15-16	1	1	2	4
17 and over			2	2
Total	87	16	17	120
Range	0-15	0-15	0-24	0-24
Mean	2.17	3.94	7.35	3.14

Note: Mean and Range relate to the total number of institutions responding.

Recommended Course Work in General And Liberal Education

As indicated in Table XXVIII, 86 of the respondents for the 120 graduate programs recommended hours in general and liberal education. This was more than twice the number of responses indicating required hours. The range of recommended hours was from 0 to 20 in the master's and specialist's programs and 0 to 30 in the doctoral programs. In the master's programs, the mean number of recommended hours was 4.41. In the specialist programs, the mean was 7.75 hours, while in the doctoral programs, the mean was 12.06 recommended hours in general and liberal education.

TABLE XXVIII

Recommended Number Of Semester Hours In General And Liberal Education

Recommended Hours	Types of Graduate Programs			
	Number of Master's Programs Reported	Number of Specialist Programs Reported	Number of Doctoral Programs Reported	Number of All Programs Reported
None	28	4	2	34
1-2	4			4
3-4	10	2		12
5-6	26	1	2	29
7-8	9	2	2	13
9-10	4	1	3	8
11-12	3	3		6
13-14	1			1
15-16	1	2	5	8
17-18				
19-20	1	1	1	3
21 and over			2	2
Total	87	16	17	120
Range	0-20	0-20	0-30	0-30
Mean	4.41	7.75	12.06	5.94

Note: Mean and Range relate to the total number of institutions responding.

V. CONCLUSIONS

In so far as the facts obtained and the opinions expressed are valid and accurate, the following conclusions may be drawn from this study.

Even though this study was limited to institutions offering graduate work for industrial arts personnel, a considerable number of these institutions offer graduate work for vocational-industrial and technical educators, especially at the doctoral level.

The majority of institutions having master's degree programs offer course hour credit for the thesis, yet a considerably lesser number of institutions actually require their students to write a thesis. Therefore, it appears that the primary opportunities for developing research competencies at the master's level are courses such as statistics, research methods, and problems.

In as much as required areas of course work and recommended hours of courses in industrial education professional courses normally comprise about one-third of a graduate student's program of study, opportunities for developing teaching and administrative competencies appear to be present in this area.

As teaching experience is a requirement prior to granting graduate degrees in the majority of specialist and doctoral programs, it appears that this requirement is generally recognized as a desirable practice for developing teaching competencies of graduate students in industrial education.

Since the recommended number of semester hours in professional education courses other than industrial education generally comprise about one-fourth of the student's program of study, opportunities for developing teaching and administrative competencies in these courses are available.

Due to the fact that a variety of course areas are offered and well over the majority of institutions recommend course work in the general and liberal education area, opportunities for graduate students in industrial education to broaden their knowledge of and experiences in such studies appear to be present.

Since a large portion of industrial arts personnel do not pursue graduate degrees beyond the master's degree coupled with the fact that less than twelve per cent of the doctoral program is devoted to the development of technical competencies, it may be concluded that the major emphasis for the development of technical competencies for industrial arts personnel must be directed to the master's and bachelor's level.

In view of the preceding conclusion coupled with the rapidly advancing technology with which industrial arts education personnel must work, it may raise the question as to whether or not the twenty-five per cent of the master's degree program devoted to the development of specialized technical competencies is adequate.

APPENDIX A

COLLEGES AND UNIVERSITIES COOPERATING IN THIS STUDY WITH NAME AND TITLE OF RESPONDENT

Colleges and Universities Cooperating in This Study with Name and Title of Respondent

Alabama

Auburn University
R. W. Montgomery, Head, Vocational, Technical and Practical Arts Education

Arizona

Arizona State College
B. Wesley Brown, Acting Director of Department of Industrial Education and Applied Arts

Arizona State University
Joseph J. Littrell, Professor of Industrial Education

Arkansas

Arkansas State Teachers College
V. A. Hukill, Professor of Industrial Education

University of Arkansas
Marion E. Maddox, Professor of Industrial Education

California

Chico State College
Glenn S. Duncan, Head, Industrial Arts Department

Fresno State College
Glen H. Blomgren, Professor of Industrial Arts

Long Beach State College
Irvin T. Lathrop, Professor of Industrial Arts

San Diego State College
Frank J. Irgang, Chairman, Industrial Arts

San Jose State College
Ralph Bohn, Chairman, Department of Industrial Arts

University of California
Melvin Barlow, Director, Division of Vocational Education

Colorado

Colorado State University
Leslie L. Gibbons, Head, Industrial Arts Department

Connecticut

University of Connecticut
John W. Karnes, Jr., Professor of Industrial Education

Georgia

Georgia Southern College
Donald P. Hackett, Chairman, Industrial Education Department

University of Georgia
O. S. Harrison, Chairman, Industrial Arts Department

Illinois

Bradley University
B. M. Cunningham, Dean, College of Applied Sciences, Department of Industrial Education

Chicago Teachers College
Coleman Hewitt, Chairman, Industrial Arts Department

Eastern Illinois University
Walter Klehm, Head, Department of Industrial Arts Education

Illinois State University at Normal
C. B. Porter, Head, Department of Industrial Arts

University of Illinois
M. Ray Karnes, Chairman, Department of Vocational and Technical Education

Indiana

Ball State Teachers College
Lloyd P. Nelson, Head, Department of Industrial Arts

Indiana State College
Lewis W. Yoho, Chairman, Division of Industrial Education

Purdue University
Harry S. Belman, Head, Department of Industrial Education

Iowa

Iowa State University
Lowell L. Carver, Chairman, Industrial Education Department

State College of Iowa
Howard O. Reed, Head, Department of Industrial Arts

Kansas

Fort Hays Kansas State College
C. Richard Cain, Division Chairman, Applied Arts Division

Kansas State College of Pittsburg
William P. Spence, Chairman, Industrial Education and Art Department

Kansas State Teachers College
E. L. Barnhart, Head, Industrial Arts Department

Kentucky

Eastern Kentucky State College
John D. Rowlett, Director of Research, Industrial Arts Department

Murray State College
Hugh Oakley, Chairman, Industrial Arts Department

Western Kentucky State College
Walter B. Nalbach, Head, Industrial Arts Department

Louisiana

Louisiana State University
Nelson A. Hauer, Head, Industrial Education

Northwestern State College
Walter J. Robinson, Head, Industrial Education Department

Southern University and Agricultural and Mechanical College
C. H. Chapman, Director, School of Vocational Education

Maine

Gorham State Teachers College
John Mitchell, Chairman, Industrial Arts Department

Maryland

University of Maryland
Joseph F. Luetkemeyer, Professor of Industrial Education

Michigan

Northern Michigan University
Kauko A. Wahtera, Head, Department of Industrial Education

Wayne State University
G. Harold Silvius, Chairman, Industrial Education Department

Western Michigan University
John L. Feirer, Head, Industrial Education Department

Minnesota

Mankato State College
Don H. Anderson, Head, Industrial Arts Department

St. Cloud State College
Raymond H. Larson, Chairman, Department of Industrial Arts

University of Minnesota
Howard H. Nelson, Chairman, Department of Industrial Education

Winona State College
Harry R. Jackson, Chairman, Division of Fine and Applied Arts

Mississippi

University of Southern Mississippi
Zed H. Burns, Chairman, Department of Industrial Arts

Missouri

Central Missouri State College
N. B. Grinstead, Chairman, Division of Applied Arts and Sciences

Northeast Missouri State Teachers College
D. D. Nothdurft, Professor of Graduate Industrial Education

University of Missouri
H. H. London, Chairman, Industrial Education Department

Nebraska

Kearney State College
Floyd Krubeck, Chairman, Vocational Arts Division

State Teachers College
M. A. Kleinbach, Professor of Industrial Arts

New Jersey

Montclair State College
Henry J. Sredl Assistant Professor of Industrial Arts Education

Trenton State College
Robert M. Worthington, Chairman, Industrial Arts Education Department

New Mexico

Eastern New Mexico University
Albert A. Bettina, Director, Industrial Education Department

New York

State University College, Oswego
Paul W. DeVore, Division Director, Division of Industrial Arts

North Carolina

East Carolina College
T. J. Haigwood, Professor of Industrial Arts

University of North Carolina
Ivan Hostetler, Head, Industrial Arts Department

Ohio

Bowling Green State University
J. Levan Hill, Chairman, Department of Industrial Arts and Engineering Drawing

Kent State University
Delmar W. Olson, Chairman, Department of Industrial Arts

Miami University
William M. Ramsey, Chairman, Industrial Arts Education Department

Ohio University
Ronald J. Baird, Assistant Professor of Industrial Arts

Oklahoma

Central State College
J. Asbury Smith, Chairman, Industrial Arts Department

Northeastern State College
William F. Van Trump, Chairman, Industrial Arts Education Department

Northwestern State College
Jerry R. Brownrigg, Head, Department of Industrial Education

Southeastern State College
Alvin M. White, Chairman, Department of Industrial Arts

Southwestern State College
John L. Cermak, Head, Industrial Arts Department

University of Oklahoma
Robert A. Hardin, Chairman, Department of Industrial Education

Oregon

Oregon State University
Chester B. Ainsworth, Head, Department of Industrial Arts

Pennsylvania

California State College
Shriver L. Coover, Director, Industrial Arts Department

Millersville State College
Earl M. Weber, Director, Industrial Arts Education Department

The Pennsylvania State University
S. T. Brantner, Professor of Industrial and
Vocational Education

South Carolina

Clemson College
A. F. Newton, Chairman of Industrial Education Curriculum

South Dakota

Northern State Teachers College
B. Harry Gunderson, Chairman, Division of Industrial Arts

Tennessee

East Tennessee State University
R. E. Buxton, Chairman, Department of Industrial Education

Middle Tennessee State College
James H. Gonce, Professor of Industrial Arts

Tennessee State University
L. C. Farbes, Head, Industrial Education Department

University of Tennessee
Joe L. Reed, Head, Industrial Education Department

Texas

East Texas State College
Welcome E. Wright, Head, Department of Industrial Education

Prairie View Agricultural and Mechanical College
Alvin I. Thomas, Dean, School of Industrial
Education and Technology

Sam Houston State Teachers College
Stephen V. Randel, Director, Industrial Arts Depar'ment

Southwestern Texas State College
Victor L. Bowers, Director, Department of
Industrial Arts

Texas A. and M. University
Everett R. Glazener, Professor of Industrial Education

Utah

Brigham Young University
Ross J. McArthur, Chairman, Industrial Education
Department

Utah State University
Carl R. Bartel, Head, Industrial and Technical
Education Department

Washington

Central Washington State College
George L. Sogge, Chairman, Industrial Arts Department

Eastern Washington State College
Loyd W. Vandeberg, Chairman, Industrial Arts Department

University of Washington
Athol R. Baily, Professor of Industrial Education

West Virginia

West Virginia University
Thomas Brennan, Coordinator, Industrial Arts Department

Wisconsin

Stout State College
Ray A. Wigen, Dean of Graduate Division,
School of Industrial Education